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AN HISTORICAL AND ANALYTICAL

# Bibliography

OF THE LITERATURE OF

Cryptology

ΒY

JOSEPH S. GALLAND NORTHWESTERN UNIVERSITY



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#### **PREFACE**

This volume is a register of the most important works that have been written, not only on the subject of cryptography, but also on its manifestations in related fields. Hence, the items presented will be seen to vary considerably in nature and content: some are scientific and technical treatises dealing with the application of cryptography to military, diplomatic, and commercial uses; others dwell on the more popular and more limited manifestations of this science, and appear in a variety of disparate forms,—in that of cuneiform, runic, and other kinds of hieroglyphic writings, in literary anagrams and acrostics, in symbolism of colors, gem, emblems, and insignia, in the jargon of children as well as that of thieves, in various types of universal languages and stenographic systems, in tramps' signs and semaphoric signals, and also in the crude devices and ingenious stratagems which were employed during primitive ages as a means of concealing and conveying thought and information.

The material of the volume was gleaned and collected from quite varied sources. For the early fundamental exploratory work of the project, full utilization was made of the facilities offered by the libraries conveniently accessible in the area of Chicago, - Deering Library of Northwestern University, Harper Memorial Library of the University of Chicago, the John Crerar Library, and the Newberry Library. Then a preliminary survey was made in some twenty representative universities in different sections of the country in order to ascertain the extent of the cryptographic material which they contained. As a result of these investigations, valuable clues and indications were disclosed which made necessary for their solution the procurement of microfilm and photostat reproductions of special works contained only in distant institutions. Then thanks to research grants accorded by Northwestern University, two trips of six or seven weeks each were made possible during the summers of 1942 and 1943 to a number of Eastern institutions which the survey showed possessed substantial amounts of the needed material. Although each and all of these depositories contributed a due share of items to our quest, in all justice it should be stated that the most extensive contributions were derived from the Fabyan Collection of the Rare Book Section of the Library of Congress, the Mendelsohn Collection of the University of Pennsylvania, the New York Public Library and the Widener Library of Harvard University.

The number of works consulted and utilized in this quest for cryptographic references and material was quite considerable and, if given in

- entirety; would make up an extensive and imposing list. However, it is hoped that an adequate idea of the extent and scope of our researches may be gained if only the most important and essential ones are named. For the purpose of clarification, these may be conveniently grouped into five classifications, as follows: (a) General works of reference; (b) Periodical indices and catalogues; (c) Works of biography; (d) Catalogues of rare books; (e) Special works on cryptography containing bibliographical lists or indications:
- (a) Encyclopedia Americana; Encyclopaedia Britannica; International Encyclopaedia; Catholic Encyclopedia; Jewish Encyclopedia; La Grande Encyclopédie; Encyclopédie ou Dictionnaire Raisonné des Sciences, des Arts et des Métiers; Brockhaus: Die Grosse Enzyklopädie; Boccardo: Enciclopedia Italiana; Enciclopedia Italiana di Scienze, Lettere ed Arti; Espasa: Enciclopedia Universal Ilustrada Europeo-Americana.
- (b) Poole's Index to Periodical Literature; Readers' Guide to Periodical Literature; International Index to Periodicals; Subject Index to Periodicals; Peddie: Subject-index of Books; Watt: Bibliotheca Britannica; International Military Digest, Annual; Répertoire Bibliographique des Principales Revues Françaises; Lotenz: Catalogue de la Librairie Française; Bibliographie der Deutschen Zeitschriftenliteratur; Bibliographie der Fremdsprachigen Zeitschriftenliteratur; Internationale Bibliographie der Zeitschriftenliteratur; Biblioteca della Camera dei Deputati; Provveditorato Generale dello Stato.
- (c) Dictionary of National Biography; Michaud: Biographie Universelle Ancienne et Moderne; Nouvelle Biographie Générale Depuis les Temps les plus Reculés jusqu'à nos Jours; Allgemeine Deutsche Biographie.
- (d) Brunet: Manuel du Libraire; Graesse: Trésor de Livres Rares; British Museum: Catalogue of Printed Books; Catalogue Générale des Livres Imprimés de la Bibliothèque Nationale; Gesamtkatalog der Preussischen Bibliotheken.
- (e) Bailey, J. E.: "Works on cryptography," Notes and Queries, Sept. 1, 1877, pp. 169-171. [Contains 40 items on cryptography); Carmona, J. G.: Tratado de criptografía, Madrid, 1894. [Bibliographical list, pp. 173-179]; Dröscher, Ernst: Die Methoden der Geheimschriften, Leipzig, 1921. [Bibliographical list, pp. ix-xi]; Figl, Andreas: Systeme des Chiffrierens, Graz, 1926. [Contains 90 items on cryptography]; Friedman, W. F.: Synoptic tables . . and a bibliography of cipher literature, Geneva, Ill., 1918. [Bibliographical list, pp. 14-16]; Gioppi, Luigi, di Türkheim: La crittografia diplomatica, militare et commerciale, Milano, 1897. [Bibliographical list, pp. 171-174]; Hughes, W. L.: "Works on cryptography," Notes and Queries, Oct. 20, 1877. [Contains 40 additions to the Bailey list]; Klüber, Johann Ludwig: Kryptographik, Tübingen, 1809. [Bibliographical list of 19 pages];

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Lacroix, Paul: La cryptographie, ou l'Art d'écrire en chiffres, Paris, 1858. [Bibliographical list, pp. 242-251]; Locard, Edmond: Les correspondances secrètes, Lyon, 1936. ["Bibliographie cryptologique," pp. 905-931]; Gyldén, Yves: "Cryptologues italiens du XVe et XVIe siècles," Revue Internationale de Criminalistique, Lyon, 1932. [Bibliographical list of 16 items]; Lange, André et E.-A. Soudart: Traité de cryptographie, Paris, 1925. [Bibliographical list of about 100 items]; Meister, Aloys: Die Geheimschrift im Dienste der päpstlichen Kurie, Paderborn, 1906. [Contains bibliographical indications interspersed throughout the work]; Schneickert, Hans: Die Geheimschriften im Dienste des Geschäfts- und Verkehrslebens, Leipzig, 1905. [Contains bibliographical indications]; Volts, James D.: Bibliography of cryptography, Cincinnati, 1938. [Bibliographical list of 18 pages]; Wagner, F.: "Studien zu einer Lehre von der Geheimschrift," Archivalische Zeitschrift, München, 1886-1888, Vol. XI, pp. 156-189; Vol. XII, pp. 1-29; Vol. XIII, pp. 8-44. [Contains bibliographical indications interspersed throughout the studies.

It was from these and many other sources that was extracted the material which was later organized into the items of this volume. It should be mentioned that in this work of organization, a definite effort was made in every instance to give the title of each work in its entirety, with date and place of publication, name of publisher, number of pages, and re-editions, if any. In a number of cases, as the titles were quite long and descriptive, it was felt that the necessity of adding copious explanatory comments was thereby lessened and in some instances precluded, since the descriptions by themselves permitted the reader to gain an adequate idea of the contents and even the value of the works. But in most cases there were added analytical commentaries,—commentaries which are of eclectic nature since they are in fact syntheses of widely gleaned bits of information contributed by many sources. And finally, in so far as it was possible, the analyses and commentaries were directed in such a manner that they should present mainly information which would be of the greatest value and interest to a cryptologist, --information concerning the technique and history of cryptography and its varied manifestations in the related fields.

The author of this volume wishes to take advantage of this opportunity to express his gratitude and appreciation to the many persons who have contributed to or aided in its growth and final completion: to President Franklyn Bliss Snyder of Northwestern University for his encouragement of the project; to the members of the staff of the Charles Deering Library of Northwestern University for their untiring aid in the procurement of needed material; to the staffs of the Rare Book Room of the Library of Congress and of the University of Pennsylvania for rendering their respective

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collections, the Fabyan and the Mendelsohn, conveniently accessible, and for providing microfilm and photostat reproductions; to various colleagues at Northwestern University for verifying the orthographic accuracy of portions of the manuscript: Professors Joseph G. Fucilla, Frank X. Spiecker, and Joseph C. Murley; to Major Donald D. Millikin of New York University for his kindness in affording access to his bibliographical notes; to Professor John W. Spargo, Editor of the Northwestern University Studies, for his editorial suggestions and aid. To Colonel William F. Friedman I am especially grateful for his continued encouragement, counsel and general contributions.

Evanston, Illinois December 7, 1944 J. S. G.

This volume is dedicated to
Lieutenant Colonel William F. Friedman,
Signal Reserve (Retired), Director of Communications Research,
Signal Security Agency, War Department,
as a token of appreciation for the many contributions
he has made to the science of cryptology.

### A

\*A\*. Leichtfassliche Anleitung zur Geheim-Schreibekunst oder Anweisung, wie man auf ganz einfache Weise jemandem etwas schriftlich mittheilen kann, das jedem Dritten ganz und gar unverständlich ist. Von \*A\*.

5. Ausl. Weissensee [1864]. pp. 7. In-8°.

Aaron, Eugene Murray. "How hieryglyphics have been deciphered." Gold-thwaite's Geographical Magazine, New York, June 1892, pp. 417-419. [Description of the stone of Rosetta and the obelisk of Philae, with an explanation of the work of Champollion and others in deciphering their inscriptions.]

Acme Code Co. Acme commodity and phrase code. San Francisco: Acme

Code Co., 1923. pp. 902. In-4°.

—— Acme supplement; an addenda [sic!] to the Acme Commodity and Phrase Code, covering a modern list of banks, vessels, cities, countries, steamship lines, port tables, private code words... New York, San Francisco, 1932. pp. 112.

Adam, J., and J. C. "Criminal investigation." Madras, 1906. [Mentioned by Hooker in "The Jules Verne Cipher," The Police Journal, London, Jan. 1931, Vol. 4, No. 1, pp. 107-119. Contains examples of processes of cipherment. See also Locard, "Bibliographie cryptologique," p. 929.]

Aeneas the Tactician (Aeneas Tacticus, 4th century, B.C.). [According to Polybius, this Greek writer was the author of several treatises on the art of war; of these, the only one in existence deals with the best methods of a defense for a fortified city. In addition, it is valuable for the large number of historical illustrations which it contains. The work was published for the first time by Isaac Casaubon, in his edition of Polybius, Paris, 1609, in-fol. There are several French translations, of which the best known is that of Beausobre: Commentaires sur la défense des places d'Aeneas le Tacticien . . ., Amsterdam and Paris, 1757. Ch. XXXI gives information concerning processes of cipherment, besides interesting descriptions of the various stratagems employed in early days to attain secrecy of communication. In commenting on this work, Polybius says that Aeneas: "had collected together twenty different manners of writings, so as not to be understood by any but those in the secret; and that these methods were partly invented by himself and partly in use before his time." For additional information concerning Aeneas the Tactician and his works consult Nouvelle Biographie Générale, Vol. 1-2, p. 337, and (under Enée le Tacticien) Biographie Universelle, Vol. 12, pp. 459-460. See also Lange et Soudart, Traité de cryptographie, III, 17, 212; Locard, "Bibliographie cryptologique," p. 922.]

- Aesop (Greek fabulist, who lived in the 7th century B.C.) [According to La Fontaine: La vie d'Esope le phrygien (édition Jouaust of Les Fables, Paris, 1842, pp. 24-25) Aesop was instrumental in revealing a treasure to his master, the philosopher Xantus, by giving him the explanation of a Greek inscription engraved on an old monument. The inscription was made up of the first letters of certain words selected in such a manner that they contained a triple meaning. For additional information concerning Aesop and his works, consult (under Esope) Biographie Universelle, Vol. 13, pp. 41-42, and Nouvelle Biographie Générale, Vol. 15-16, pp. 392-394.
- African, Julius the (Africanus, Sextus Julius, died A.D. 232). [To this Greek historian has generally been attributed the authorship of a work of 24 books, usually known under its French title of les Cestes, dealing with agriculture, medicine, physics, and especially military art. The Bibliothèque Nationale, Paris, possesses a manuscript copy of the section dealing with the art of war. It was translated into French by Guischardt in Vol. III of his Mémoires critiques et historiques sur plusieurs points d'antiquités militaires. Paris, 1774. 4 vol. In-4°. However, according to a number of modern authorities, the work is nothing more than a copy of Commentaires sur la défense des places d'Aeneas le Tacticien. For additional information concerning Julius the African and his works consult Biographie Universelle, Vol. 1, pp. 211-212, and Nouvelle Biographie Générale, Vol. 1-2, pp. 354-355. See also Lange et Soudart, Traité de cryptographie, III, 17.]
- Agapeyeff, Alexander d'. Codes and ciphers. New York and London: Oxford University Press, 1939. pp. 160. In-8°. (New edition, ibid, 1942.) ["History of codes and ciphers from their beginnings through the Middle Ages down to the present. A final chapter gives specific instructions as to methods of deciphering." Bibliographical list, pp. 159-160.]
- Agrippa von Nettesheim, Heinrich Cornelius. Henrici Corneli Agrippae ab Nettesheym, . . . Opera . . . quibus post omnium editiones de novo accessit Ars notoria . . . Lugduni: per Beringos fratres [1531]. 2 vol. In-8°. [The Mendelsohn Collection of the University of Pennsylvania possesses a negative photostat copy of Tables II-VIII from Vol. I. For information concerning the author and his works consult: Allgemeine Deutsche Biographie, Vol. 1, pp. 156-158; Biographie Universelle, Vol. 1, pp. 246-247; Nouvelle Biographie, Générale, Vol. 1-2, pp. 422-423.]
- Airenti, F. Dictionnaire chiffré, diplomatique et commercial. Paris, 1893. In-16°. [En groupes de 5 chiffres; comprend 59.200 groupes].
- Versigraphe français (le "Chiffre" en poche). 2º édition. Paris, 1904. In-32°.
- Aktiebolaget Cryptograph. Cryptograph. (Damm Brothers). Stockholm: Aktiebolaget Cryptograph, 1922. pp. 21.

- Alberti, Leone Battista. Trattati in cifra. Roma, c. 1470. [Four manuscript copies of this treatise are known to exist today in the following depositories: Chigi Library, Rome; Vatican Archives, Rome; Vatican Library, Rome; and Archives of Venice, Venice. The Latin original is reproduced in extenso in Meister's Die Geheimschrift im Dienste der pāpstlichen Kurie . . ., pp. 125-141; and information concerning the author and his works is given, pp. 24-29. The treatise deals especially with theories and processes of cipherment, methods of decipherment, and statistical data. William F. Friedman calls it "the oldest tract on cryptography that the world now possesses." For additional information concerning Alberti and his works consult Biographie Universelle, Vol. 1, pp. 336-337, and Nouvelle Biographie Générale, Vol. 1-2, pp. 617-618. See also Brown, Calendar of State Papers; Dröscher, Die Methoden der Geheimschriften . . ., IX; Lange et Soudart, Traité de cryptographie, III, 19, 20, 212, 213; Locard, "Bibliographie cryptologique," p. 905; Vigenère, Traicté des chiffres . . ., (1587 edition), p. 209.7
- Opusculi morali. Venezia, 1568. [This work was translated into Italian and edited by Cosimo Bartoli. It contains a chapter, pp. 200-221, dealing with ciphers. See also item on Cosimo Bartoli in this volume.]
- Alberti on deciphering. [Translation by Charles J. Mendelsohn from Meister's Die Geheimscrift im Dienste der päpstlichen Kurie . . ., p. 127, line 9 to p. 133, line 21. It is contained in the Mendelsohn Collection of the University of Pennsylvania.]
- Alcántara, M. (Capitão). "Cryptotecnia." Boletim Mensal do Estado Maior do Exército, June 1916, pp. 407-418. [Description of the organization of a bureau for cipher-writing. It contains a bibliographical list of 8 items. This article has been translated into English for the War College.]
- Alciati, Andrea. Emblemata, cum explicatione per Claudium Minoem. Excepta ex ejusdem in eadem Alciati emblemata majorum vigiliarum commentariis. Ad calcem Alciati vita nuper ab eodem Minoe conscripta. Lugduni Batavorum, ex officina Plantiniana, apud Franciscum Raphelengium, 1591. pp. 398. In-16°. [The Emblems is a collection of short Latin poems of four, six, eight or twelve verses containing moral reflections. The 1571 edition of the author's complete works contains two different versions of the poems. The work was translated into French by Jean Le Fèvre in 1536, and a new translation was made by Claude Mignault in 1584. For additional biographical and bibliographical information concerning Alciati and his works consult Biographie Universelle, Vol. 1, pp. 364-365 and Nouvelle Biographie Générale, Vol. 1-2, pp. 696-697.]
- Alcocer, Mariano. "Cryptografía española." Revista de Archivos, Bibliotecas y Museos, Madrid, 1921, Epoca 3, Tomo 42, pp. 628-640. [Deals with

the codes used by Felipe II of Spain in his correspondence with certain

other persons. The key is reproduced on pp. 634-640.]

"Cryptografía española." R. Academia de la Historia, Bol., Madrid. 1934, Tomo 105, pp. 337-341. [This article is followed, on pp. 345-460, by 25 cipher alphabets reproduced from Archivo General de Simancas.

- Alexander's Weekly Messenger, Philadelphia. [". . . Between 15 January and 18 April [1840] fifteen articles on ciphers appeared in Alexander's, and . . . thirty-six ciphers were published or alluded to. Poe published the text and solution of eleven ciphers; the solution, but not the text, of sixteen. Three ciphers he stated merely that he had solved. Six he had for various reasons failed to solve; one he had lost, one he had had no time to examine, one was written in pencil and "defaced," two were "impositions," and one had fifty-one characters and hence lay outside the limitation which he had prudently set down in his initial challenge." -Wimsatt, "What Poe knew about cryptography," Publications of the Modern Language Association of America, New York, Vol. LVIII. Sept. 1943, No. 3, p. 755.
- Allen, Don Cameron. "Symbolic color in the literature of the English Renaissance." Philological Quarterly, Iowa City, Ia., Jan. 1936, Vol. XV, No. 1, pp. 81-92.

- "Ben Jonson and the hieroglyphics." Philological Quarterly, Iowa City, Ia., Vol. XVIII, pp. 290-300.

Allen, John. Allen's cryptograph, or secret letter writer, with directions for condensing telegrams. New York: Allen & Co., 1882. pp. 21.

Almeida Ribeiro, F. de, and Almeida Henriques (Custodia de). "A frequencia relativa das letras e a cryptografia da lingua portuguesa." Archivo de medicina legal, Lisboa, 1931, Vol. IV. [Contains statistical data dealing with cryptography. See also Locard, "Bibliographie cryptologique," p. 921.]

"Alphabet, The origin of the." Analytical Digest, Chicago, March

1927, Vol. 1, No. 3, pp. 7-11.

Alten, von, ----. "Geheimschriften." Handbuch für Heer und Flotte, Berlin, 1912, Vol. IV, p. 105. [Deals with processes of cipherment. See also Locard, "Bibliographie cryptologique, p. 917.]

American Code Co. ABC numeral system, consisting of more than 100,-000 five-letter code words, numbered consecutively. New York: American Code Co., 1923. pp. 437.

— ABC universal commercial electric telegraph code. New York: American Code Co., 4th ed., 1899; 5th ed., 1902; Spanish ed., 1905; 7th ed., 1936.

Ammann, Martin. "Die Geheimsprachen . . . Geheimschriften . . .". Bändchen der Volksbibliothek "Eigenes Wissen," Leipzig, c. 1890, Vol. 20. [Deals with processes of cipherment. See also Locard, "Bibliographie cryptologique," p. 929.7

- Ammon, K. "Wie kann man Geheimschriften sicher machen?" Die Woche, Berlin, 1237.
- Anderberg, Erik. "Maritim förbindelsetjänst under världskriget." Stockholm, 1926, pp. 87-91 et seq. [Contains information of historical interest. See also Locard, "Bibliographie cryptologique," p. 930.]
- Andersen, Carl. Den hemmelige Skrivekunst. En Samling af Chiffersystemer af Carl Andersen. Kjøbenhavn: J. L. Wulff's Forlag. 1890. pp. 47. [Deals with processes of cipherment. See also Locard, "Bibliographie cryptologique," p. 914.]
- Anderson, Thomas. History of shorthand, with a review of its present condition and prospects in Europe and America. London: W. H. Allen & Co., 1882. pp. viii, 311. In-8°. [Description of various systems, including those used in classical and medieval times.]
- Catechism of shorthand. Being a critical examination of the various styles, with special reference to the question: Which is the best English system of shorthand? London: W. H. Allen & Co., 1882. pp. vii, 70.
- Shorthand systems: being a full discussion by various English authors and experts . . . With specimens of Taylor's, Gurney's . . . Lowe's, &c. Edited by T. Anderson. London: L. U. Gill, 1884. pp. 113. In-8°.
- ——— Anderson's systematic abbreviations, English and French, for hand-writing, machine-writing, shorthand . . . telegraphy. Paris: Galignani, 1885. In-8°.
- Andres, Johann Baptist. Steganographie; oder, Die Geheimschreibekunst. Kein Kommentar, sondern ein Gegenstück zur G. . . L. . schen Kunst der Geheimschreiberei. Nürnberg, in der Steinischen Buchhandlung, 1799. xvi, 88, [2]p. [Written in answer to Lemang's pamphlet, Die Kunst der Geheimschreiberei. Leipzig, 1797. It contains processes of cipherment. Wagner states in his "Studien," Vol. XIII, p. 43: "In diesem Schriftchen ist mehr von Stenographie als von Kryptographie die Rede." For additional information concerning Andres and his works consult Allgemeine Deutsche Biographie, Vol. 1, pp. 450-451. See also Klüber, Kryptographik, p. 12; Locard, "Bibliographie cryptologique," p. 911.]
- Angammarre, Edmond Clément (Commandant). Déchiffrement de la cryptographie sans instruments du commandant Deltheil. Essai de déchiffrement. Paris: H. Charles-Lavauzelle, 1899. pp. 37. In-8°. [Describes the method of decipherment used. See also Lange et Soudart, Traité de cryptographie, IX, 83; Locard, "Bibliographie cryptologique," p. 916.]
- Anglés, Pedro Martyr. Prontuario orthológi-gráphico trilingue. En que se enseña á pronunciar, escribir y letrear correctemente en Latín, Castellano y Catalán. Con una Idia-graphía o arte de escribir en secreto o con llave ideagráphica. Su author el R. P. Lector Fr. Pedro Martyr Anglés.

Barcelona - Por Mariano Soldevilla, 1742. pp. 443. [For biographical information consult (under Anghiera, Pietro Martire d'): Biographie Universelle, Vol. 1, pp. 697-698; Espasa: Enciclopedia Universal Ilustrada, Vol. 5, pp. 552; Nouvelle Biographie Générale, Vol. 1-2, pp. 654-655.]

Arrlei zung für den Gebrauch des Signalbuches der Kaiserlichen Marine mit Blicksignalen. Berlin: Königliche Geheime Ober-Hofbuchdrucker ei, 1874. pp. 24.

Arileizung zur Geheimschrift. Berlin, 1828. pp. 15. In-8°. [Contains processes of cipherment. See also Locard, "Bibliographie cryptologique," p. 911; Wagner, "Studien," Vol. XIII, p. 37.]

Arzleizung, Kurze, zur Tachygraphie oder zu der Erlernung des Geschwindschreibens vermittelst einfacher Abkürzungen besonders für Studierende auf Universitäten. Mit einer Kupfertafel. Jena: Schreiber, 1814. pp. 14.

Apgar, Charles E. "How I cornered Sayville." Wireless World, London, Nov. 1915, pp. 518-520.

Appier Hanzelet, Jean. Recveil de plusieurs Machines militaires, et feux artificiels pour la guerre, & récréation; avec l'Alphabet de Trittemius, par laquelle (sic) chacun qui sçait escrire peut promptement composer congruement en latin. Aussy le moyen d'escrire la nuict à son amy absent; de la diligence de Iean Appier, dit Hanzelet, chalcographe, et de Franzozis Thybovrel, chirurgien. Au Pont-à-Movsson, par Charles Marchant, 1620. pet. in-4 fig. [Bound with, and immediately following the five parts which make up the Recveil, are the following two parts: Met hode pour escrire occultement à son amy par l'alphabet de Trittem jus, par laquelle l'on peut escrire & composer congruëment en latin promptement. . . . Recueillie et mise en lumière par la diligence de Franz çoi.s Thybovrel & Iean Appier, dit Hanzelet. Pont-à-Movsson: C. Marchart, 1620.—Methode pour escrire de nvict, a son amy absent, et luy faire concevoir son intention . . . Chose tres-vtile a toutes personnes qui exe reent l'art militaire: mise en lumiere, par la diligence & fraix de Franzsois Thybovrel . . . et Iean Appier, dit Hanzelet . . . Av Pont-à-Movsson, par Charles Marchant, imprimeur de son altesse, M.DC.XX. The subjects treated in the five parts are: 1st, means of attack; 2d, means of defense; 3d, models of various war machines; 4th, "feux de guerre"; 5th, "feux de joie." Then follows the Methode pour escrire occultermen t à son amy par l'alphabet de Trittemius . . . The method consists in the use of torches to which values of a letter have been given: thus for example, A is expressed by a single torch, B by two, C by theree, etc. For biographical and bibliographical information concerning Appier Hanzelet and his work consult, under "Hanzelet", Biographie Universelle, Vol. 18, p. 426 and Nouvelle Biographie Général e, Vol. 23-24, pp. 315-317.]

"Appunti crittografici." Rivista di Fanteria, Roma, 10, 1901, pp. 796-811.

- "A private inquiry." Chambers's Journal, London, Mar. 31, 1866, Vol. XLIII, pp. 193-197. (Also reprinted in Every Saturday, Boston, Apr. 14, 1866, pp. 395-398 et seq.). [A newspaper cipher is analysed and deciphered by means of a dictionary code.]
- Arensberg, Walter C. The cryptography of Dante. New York: A. A. Knopf, 1921. pp. 494. [Contents: 1. Dante—Symbolism. 2. Dante. Divina commedia. 3. Cryptography.]
- The cryptography of Shakespeare. Evidence that William Shake-speare is the pseudonym of Francis Bacon. Los Angeles: Howard Bowen, 1922. pp. 280. [Contents: 1. Bacon, Francis, Viscount St. Albans—Cipher. 2. Shakespeare, William—Authorship—Baconian theory. Reviewed in Baconiana, London, Mar. 1924, Vol. 17, p. 224.]
- John Howell, 1923. pp. 47. In-8°. Ils.
- The burial of Francis Bacon and his mother in the Lichfield chapter house; an open communication to the Dean and chapter of Lichfield concerning the Rosicrucians . . . Pittsburgh, Pa.: the author, 1924. pp. 46. 20 pll., facss.
- The Baconian keys. Revised edition. Pittsburgh, Pa.: the author, 1928. pp. 115.
- The magic ring of Francis Bacon. Pittsburgh, Pa.: the author, 1930. pp. 64. In-4°. Ils., pll. [A description of a cryptographic structure in Bacon's writings. Reviewed by H. S., Baconiana, London, Aug. 1930, Vol. 20, p. 217.]
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Argenti's work is invaluable for the study of papal ciphers. It deals with theories and processes of cipherment, methods of decipherment, and cipher keys. In summing up the value of Argenti's contributions, Meister says: "Die wichtigste von den Chiffrenarbeiten des Matteo Argenti ist unstreitig sein grosses Chiffrenbuch. Es sollte ein Familienbuch werden, aus dem spätere Mitglieder der Familie Argenti das gesamte Chiffrenwesen der Zeit Gianbattistas und besonders Matteos Argenti erkennen sollten. Das Schicksal wollte es, dass es heute einen grösseren Beruf erfüllen soll, nicht nur für Familienglieder der Argenti, sondern für uns alle ist es die wichtigste Quelle zur Erkenntnis des damaligen, besonders des päpstlichen Chiffrenwesens geworden."—Op. cit., p. 65, Il. 3-10. See also Lange et Soudart, Traité de cryptographie, V, 34; Locard, "Bibliographie cryptologique," p. 907.]

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in cifra): "Je ne crois pas qu'il existe nulle part un traité plus complet sur l'art d'écrire en chiffres ainsi qu'une histoire plus développée de cet art. Le second chapitre, composé de soixante-neuf feuillets, est une dissertation sur la science des chiffres pour les correspondances secrètes: c'est une sorte de grammaire. Le troisième porte le titre de Polisteganografia; le quatrième, Apogriptografia; le cinquième traite des chiffres invisibles; le sixième expose les chiffres inventés par l'auteur; le septième et le huitième fournissent des exemples et traitent de l'usage et emploi des clefs pour le déchiffrement." For additional information see Lange et Soudart, Traité de cryptographie, V, 34; Locard, "Bibliographie cryptologique," p. 906; Meister, Die Anfänge der modernen diplomatischen Geheimschrift, pp. 24-25; Meister, "Zur Kenntnis des venetianischen Chiffrenwesens," pp. 329-330; Pasini, R. Archivio di Venezia, 1873, p. 328; Wagner, "Studien," Vol. XII, p. 10.]

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——— Clavis diplomatica, tradens specimina veterum scripturarum, nimirum alphabeta varia, compendia scribendi medii aevi, notariorum veterum signa nonnulla curiosa, una cum alphabeto instrumenti et abbreviaturis, singula Tabulis aeneis exhibita: qvibus praemittuntur introductiones necessariae, subiiciuntur scriptores rei diplomaticae aliaqve ad lectionem et intelligentiam veterum codicum, chartarum et diplomatum facientia, variis annotationibus historico-literariis hinc inde additis, studio et opera. Danielis Eberhardi Baringii. Hanoverae, sumptibus Haeredum B. Nic. Försteri et filii. MDCCXXXVII. pp. 195. [For information concerning the author and his works consult Allgemeine Deutsche Biographie, Vol. 2, pp. 65-66 and Biographie Universelle, Vol. 3, p. 100. See also Giry, Manuel de diplomatique, p. 66; Locard, "Bibliographie cryptologique," p. 924; Prou, Manuel de paléographie latine et française, pp. 6, 7.]

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<sup>\* &</sup>quot;My article says Blair first published in 1802, and hence Gage's work could well be 1809."—William F. Friedman.

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Collange, Gabriel de. La polygraphie, et vniuerselle escriture cabalistique de M. I. Tritheme abbé. Traduicte par Gabriel de Collange, natif de Tours en Auuergne. A Paris, pour laques Keruer demeurant en la ruë sainct laques, à l'enseigne de la Licorne, 1561. Avec privilege dv roy. pp. 300 numb. In-8°. (Pp. 229-243 contain: Exposition avec exemples, de ce qve par l'autheur pourroit auoir esté obmis, ou par luy trop obscurément traicté és prologues, tât de l'œuure, que de la Clauicule de Polygraphie de M. I. Tritheme, par M. A. Glauburg.). Other editions: Paris, 1564, 1621, 1625; Amsterdam, 1626. [A pirated edition was published at Groningen, 1620, by Dominique de Hottinga under the title: Polygraphie ou méthode universelle de l'escriture cachée et cabalistique. Collange's translations are of value for the processes of cipherment, and information they contain concerning the history of cryptography. For biographical information concerning Collange and his work consult

Biographie Universelle, Vol. 8, p. 584 and Nouvelle Biographie Générale, Vol. 11-12, pp. 149-150. See also Carmona, Tratado de criptografía, pp. 81-82, 174; Dröscher, Die Methoden der Geheimschriften ..., IX, 26; Klüber, Kryptographik, p. 15; Lange et Soudart, Traité de cryptographie, IV; Locard, "Bibliographie cryptologique," p. 906; Meister, Die Geheimschrift im Dienste der päpstlichen Kurie ..., pp. 102, 107; Wagner, "Studien," Vol. XI, p. 173; Vol. XII, pp. 20-22.]

Polygraphie et vniverselle escriture caballistique de M. I. Trithemius Abbé. Avec les Tables & Figures concernants l'effaict & l'intelligence de l'occulte escriture: vtile convenable & necessaire principalement aux Roys, Princes, Comtes, Republiques & tous Amateurs de la subtilité, industrié & rarité. Traduicte par Gabriel de Collagne [sic.], natif de Tours en Auvergne. A Paris, Pour Iaques Kerver, demeurant en la ruë sainct Iaques, à l'enseigne de la Lincorne, & de nouveau l'An 1625. Avec Privilege du Roy. pp. 338.

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Collon, A. Etude sur la cryptographie, son emploi à la guerre et dans la diplomatie... Bruxelles: Falk, 1899. pp. 566. In-16°. [Reprinted from various numbers of the Revue de l'Armée Belge, from Sept.-Oct. 1899 to Jan.-Feb. 1906, with original pagination retained. Besides information about processes of cipherment, this study gives considerable material concerning the peculiarities of the French language. See also Lange et Soudart, Traité de cryptographie, X, 83; Locard, "Bibliographie cryptologique," p. 917.]

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MDXCIII. ff.93. In-4° obl. [This work is frequently referred to as Scotografia Italica. . . . It comments freely upon Porta, and stresses processes of cipherment. The Mendelsohn Collection of the University of Pennsylvania possesses 93 numbered leaves, 2 le. Sig. A-I4, K-V4, X-Z4, 1 le., Sig. A6, W6. "Segvono gli ordini, & le regole, per l'uso della cifra del primo libro": Sig. A-I4, K-V4, X-Z4. "Segvono gli ordini, & le regole, per l'uso della cifra del secondo, e terzo libro"; Sig. A6, W6. 7 le., 7 le. title page, dedication and table of contents. Collation of the original on basis of the fac-simile: Sig. A6, B1, paged in duplicate. See also Carmona, Tratado de criptografia, p. 174; Klūber, Kryptographik, p. 4; Lange et Soudart, Traité de cryptographie, V, 27; Locard, "Bibliographie cryptologique," p. 907; Wagner, "Studien," Vol. XII, pp. 19-20; Giuseppe Jarè, A. Colorni Ingegnere Mantovano del secolo XVI. Cenni . . . con documenti inediti. Mantova, 1874. In-8°.]

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  - Traité de la parole, langues et écritures; contenant la stéganographie impénétrable, ou l'art d'écrire & de parler occultement de loin & sans soupçon. Avec tout ce qui concerne les encres, cachets & cire à cacheter. Par monsieur Comiers . . . Bruxelles, Chez Jean Leonard, 1691. pp. 276. In-12°. [See Carmona, Tratado de criptografía, p. 176; Lange et Soudart, Traité de cryptographie, XIII.]
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## D

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†"Cryptanalysis." Signal Corps Bulletin, Washington, D. C., June 1925. [Example of the type of cryptogram employed in diplomatic correspondence by European foreign offices during the early part of the eighteenth century. Interlinear translation is given, and students are

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— †"Edgar Allan Poe, Cryptographer." Signal Corps Bulletin, Washington, D. C., July-Sept. 1937, No. 97, pp. 41-53 and "Addendum," Oct.-Dec. 1937, No. 98, pp. 54-75. [An analysis of Poe's work and writings in the cryptographic field, including a translation of the earliest tract on cryptography and a facsimile of Jefferson's invention of the cylindrical cipher device.

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& linguis clam, apertè; obscurè, & dilucidè scribere & respondire posse docetur, & demonstratur. In III. syntagmata distributa in principum gratiam ac recreationem inuenta & . 1 lucem edita. Felicibus auspicijs Leopoldi I. Rom. Imperat. semper Augusti, Roma, ex typographia Varesij. MDCLXIII Superiorum permissu. Appendix apologetica ad Polygraphiam nouam in qua cryptologia trither chana discutitur, & arcana paradoxa à trithemio proposita, ad veritatem examinata, partim approbantur, partim tanquam superstitiosa confutantur. pp. 148, 23. (Another edition appeared at Amsterdam, 1680. In-fol.). [The majority of authorities consider this work, which stresses processes of cipherment and codes, to be based more or less upon that of Tritheim. Lange and Soudart detect an additional influence,—that of Vigenère. According to them Kircher "a transformé Vigenère en remplaçant les alphabets littéraux par des alphabets numéraux . . . Inventeur d'un cryptographe: l'Arca glottotactica . . . Le système du Père Kircher est aujourd'hui abandonné." The work is summarised as follows in Biographie Universelle, Vol. 21, p. 645; "Cet ouvrage, fort curieux, est divisé en trois essais: le premier offre une pas graphie, ou écriture universelle, que chacun peut lire dans sa longue. Le principe d'où il part est un dictionnaire numéroté, tel que Becher l'avait proposé sans l'exécuter. Kircher l'exécute en petit sur cinq langues (le latin, l'italien, le français, l'espagnol et l'allemand). Son vocabulaire a environ seize cents mots; les formes variables des noms et des verbes sont exprimées par des signes de convention. Le second essai donne une stéganographie plus ingénieuse que celle de Tritheim; et le troisième, une boîte ou bureau stéganographique, pour écrire ou lire très-promptement un chiffre indéchiffrable." For additional information concerning Kircher and his works consult: Allgemeine Deutsche Biographie, Vol. 16, pp. 1-4; Biographie Universelle, Vol. 21, pp. 642-646; Nouvelle Biographie Générale, Vol. 27-28, pp. 769-776. Also see Carmona, Tratado de criptografía, pp. 62, 175; Dröscher, Die Methoden der Geheimschriften. . . . IX, 33, 34; Lange et Soudart, Traité de cryptographie, VI, 47, 214, 245; Locard, "Bibliographie cryptologique," p. 909; Wagner, "Studien," Vol. XI, pp. 178-181; Vol. XIII, pp. 24-25.]

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Conspicuous Living Characters of France, Philadelphia, in Graham's Magazine, April 1841. See also Lange et Soudart, Traité de cryptographie, p. 300; Locard, "Bibliographie cryptologique," p. 912.]

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in-fol; Estrasburgo, 1602; Argentorati, 1603, 1606. Dröscher gives 1616, n.p.) [This celebrated work is of encyclopedic nature. Book I deals with the cryptographic knowledge of the ancients; Book II gives 180 examples of the ciphers of his period; Book III is a treatise on deciphering. (Argenti states in his own treatise that he drew generously upon Porta's work.); Book IV contains very useful tables of various combinations of syllables and words. The importance and value of the contributions of this mathematician of Naples, inventor of the camera obscura, have been commented upon by many of the most noted workers in the field of cryptography: "Fondateur, avec Vigenère, de la cryptographie moderne. À perfectionné les systèmes de substitution simple et inventé la substitution double." - Lange et Soudart; "Le premier traité de cryptographie où il soit question de principes de déchiffrement est dû à Porta." - Kerckhoffs; "Portas Buch hat eine grosse Verbreitung und wiederholte Auflagen erlebt, ja sogar auch unberechtigter Nachdruck, ein offenkundiges Plagiat ist an ihm verübt worden, so sehr wurde es begehrt. Daraus ist der Einfluss Portas auf die Entwicklung der Kryptographie zu ermessen."-Meister. For additional information concerning Porta and his works consult: Biographie Universelle, Vol. 34, pp. 124-126; Nouvelle Biographie Générale, Vol. 39-40, pp. 842-843. See also Carmona, Tratado de criptografía, pp. 7, 59-60, 174; Dröscher, Die Methoden der Geheimschriften. . ., IX, 4, 10; Klüber, Kryptographik, p. 11; Lange et Soudart, Traité de cryptographie, V, 2, 19, 27-28, 213; Locard, "Bibliographie cryptologique," p. 906; Meister, Die Geheimschrift im Dienste der papstlichen Kurie . . ., pp. 44-45; Pratt, Secret and urgent, pp. 118-119, 142, 164: Prou, Manuel de paléographie latine et française, p. 81; Wagner, "Studien," Vol. XI, p. 174; Vol. XII, pp. 14-18.]

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- Dröscher, Die Methoden der Geheimschriften. . ., IX, 4; Klüber, Kryptographik, pp. 11, 14; Lange et Soudart, Traité de cryptographie. V, 2, 19, 27; Locard, "Bibliographie cryptologique," p. 907; Meister, Die Geheimschrift im Dienste der päpstlichen Kurie . . ., p. 45, note; Wagner, "Studien," Vol. XII, pp. 16-19.]
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following Latin edition appeared in 1681: C. A. Ramsaij. Tacheographia, seu ars breviter et compendiose scribendi methodo brevissimo tradita, ac paucissimis regulis comprehensa. Francof. et Lipsiae, 1681. In-8°. The earliest German translation of the Latin original appeared in 1679: C. A. Ramsaij. Neu vermehrte Tacheographia, oder geschwinde Schreib-Kunst . . . auffs neuwe durch gesehen . . . Leipzig, 1679. In-8°. A German translation from the English appeared in 1743: Engelländers Carl Albert Ramsay Tacheo graphia, oder: Geschwind-schreibekunst, vermittelst welcher ein jedweder die teutsche sprache durch gewisse zeichen. oder verkürtzte buchstaben, so fertig zu schreiben, als selbige mag geredet werden . . . Aus den englischen ins teutsche übersetzet. Leipzig, C. F. Gessner, 1743. The above 1681 French version was reprinted at Paris in 1688, and under the new title: Nouvelle méthode, ou l'art d'écrire . . . in-12°, in 1690 and 1692. Ramsay's work contains an appendix on cryptography, in which are stressed processes of cipherment and methods of deciphering. In speaking of this work Klüber says in his Kryptographik, pp. 11-12: "Ob dieser Anhang auch bei folgenden Ausgaben befindlich sey, ist mir unbekannt: C. A. Ramsay, Tacheo graphia, Jenae, 1681, 1684. 8. Paris, 1683. 12. C. A. Ramsay, Tacheo graphie. Leipz. 1743. 8. Mit fig. Auch eine französische Übersetzung erschien zu Paris, 1683. 12. mit Kupf. Ebend. 1692. 12. mit Kupf." For additional information concerning Ramsay and his works consult Biographie Universelle, Vol. 35, p. 158 and Dictionary of National Biography, Vol. XLVII, p. 239.]

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- Schott, Gaspar. P. Gasparis Schotti . . . Schola steganographica, in classes octo distributa, quibus, præter alia multa, ac jucundissima, explicantur artificia nova, queis quilibet, scribendo epistolam qualibet de re, & quocunque idiomate, potest alteri absenti, eorundem artificiorum conscio, arcanum animi sui conceptum, sine ulla secreti latentis suspicione manifestare: scriptam ab aliis eadem arte, quacunque linguâ, intelligere & interpretari . . . Cum figuris æri incisis . . . Norimbergæ, sumptibus Iohannis Andreae Endteri, & Wolfgangi junioris hæredum, excudebat Jobvs Heriz, typographus herbipol. Anno M.DC.LXV. pp. 346. In-4°. (Other editions: 1666, 1680. In addition, Gioppi and Riverbank list give Rome, 1665.) [This work, which appears to have been greatly influenced by that of Kircher, stresses processes of cipherment. An appraisal of the value and influence of Scott's contributions is given in Biographie Universelle, Vol. 38, p. 429: "Depuis Schott, la science d'écrire en chiffres a tellement été perfectionnée que son ouvrage, quoique plus complet et plus curieux que ceux de Trithème, de Porta, de Vigenère et de Gustavus Selenus est à peu près inutile." For additional information concerning Schott and his works consult Biographie Universelle, Vol. 38, pp. 428-429. See also Carmona, Tratado de criptografía, pp. 138, 175; Klüber, Kryptographik, p. 12; Lange et Soudart, Traité de cryptographie, VI, 47, 48, 214; Locard, "Bibliographie cryptologique," p. 909; Wagner, "Studien," Vol. XI, pp. 182-184.]

- P. Gasparis Schotti . . . Magia universalis naturæ et artis, sive, Recondita naturalium & artificialium rerum scientia, cujus ope per variam applicationem activorum cum passivis, admirandorum effectuum spectacula, abditarumq inventionum miracula, ad varios humanæ vitæ usus, eruuntur. Opus quadripartitum . . . Herbipoli, sumptibus hæredum Joannis G Schönwetteri, bibliopol. francofurtens., excudebat H. Pigrin. typographus herbipolensis, 1657-1659. 4 vol. in 2. In-4°. [A reprint of the work appeared in 1677 without any changes whatsoever. The contents of Part IV are summarised in Biographie Universelle, Vol. 38, p. 429: "Le dernier volume contient des notions détaillées sur les divers moyens imaginés par les anciens et les modernes pour se communiquer leurs pensées, par la parole ou par l'écriture, d'une manière cachée." The Mendelsohn Collection of the University of Pennsylvania possesses a photostat copy of "Liber primus De magia cryptographica, et cryptologica," Vol. IV, pp. 1-90, of the Magia universalis naturæ et artis . . . 1659. See also Carmona, Tratado de criptografía, p. 175; Klüber, Kryptographik, pp. 12, 19; Lange et Soudart, Traité de cryptographie, VI, 47, 48; Locard, "Bibliographie cryptologique," p. 923; Wagner, "Studien," Vol. XI, p. 181; Vol. XIII, pp. 25-26.]

Organum mathematicum libris IX. explicatum à P. Gaspare Schotto, e Societate Jesu, quo per paucas ac facillimè parabiles tabellas, intra cistulam ad modum organi pnevmatici constructam reconditas, pleræque mathematicæ disciplinæ, modo novo ac facili traduntur. Opus posthumum. Herbipoli, sumptibus Johannis Andreæ Endteri, & Wolfgangi jun. hæredum, excudebat J. Hertz . . ., 1668. 2 v. pp. 858. In-4°. [Consult liber VIII, "Steganographicus." "C'est la description très détaillée que le Père Schott donne d'un instrument que le Père Kircher avait inventé. . ."-De Backer-Sommervogel, IV, col. 1065.]

P. Gasparis Schotti . . . Technica curiosa, sive Mirabilia artis, libris XII. comprehensa . . . Norimbergæ, sumptibus Johannis Andreæ Endteri, & Wolfgangi junioris hæredum, excudebat J. Hertz, typographus herbipol., 1664. pp. 1044. [Consult "De cryptographia, seu occulta scriptione, nonnulla," pp. 542-547.]

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Noribergense is: Resene Gibronte Runeclus Hanedi, and that he is known also by the name: Janus Hercules de Sunde. His work is valuable for the information it gives concerning the history of cryptography, processes of cipherment, methods of deciphering, and bibliographical indications. For information concerning Schwenter and his works consult Allgemeine Deutsche Biographie, Vol. 33, pp. 413-414. See also Carmona, Tratado de criptografía, p. 174; Dröscher, Die Methoden der Geheimschriften . . ., IX, 19, 45, 59; Klüber, Kryptographik, pp. 6-7, 14; Lange et Soudart, Traité de cryptographie, VI, 45; Locard, "Bibliographie cryptologique," p. 908; Wagner, "Studien," Vol. XIII, pp. 12-16.]

Steganologia & steganographia aucta. Geheime, magische, natürliche, Red unnd Schreibkunst; Auff vielfältigs begehren guter Freunde, Auffs neue revidirt, an etlichen orten corrigirt, was verborgen geschrieben detegirt, mit schönen und wunderlichen Künsten, der Steganologiae unnd Steganographiae zugethan, augirt und dann zum drittenmal in Truck verfertiget. Durch Janum Herculem de Sunde, sonst Resene Gibronte Runeclusam Hanidem, der Magiae naturalis besondern Liebhabern. Nürnberg, In verlegung Jeremiae Duemlers. (ca. 1620). pp. 370. In-8°.

Steganologia & steganographia aucta, geheime, magische, natürliche Red- und Schreibkunst; auff vielfältigs begeren guter Freunde. Auffs neue revidirt, an etlichen orten corrigirt, was verborgen geschrieben detegirt, mit schönen und wunderlichen künsten der steganologiae und steganographiae zugethan augirt . . . durch Janum Herculem de Sunde . . . Nürnberg, in verlegung Simon Halbmayers. 1620? pp. 320.

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concerning secret inks, criminal argots, and cryptography.]

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p. 615.

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de criptografía, p. 174; Dröscher, Die Methoden der Geheimschriften . . ., IX, 19; Gardthausen, Griechische Palāographie, pp. 231-232; Klüber, Kryptographik, p. 16; Lange et Soudart, Traité de cryptographie, IV, VI, 41; Locard, "Bibliographie cryptologique," p. 908; Prou, Manuel de paléographie latine et française, p. 81; Wagner, "Studien," Vol. XI, pp. 174-178; Vol. XIII, pp. 16-24.]

The cryptomenytics and cryptography of Gustavus Selenus [Pseud.] in nine books. Wherein is also contained a most clear elucidation of the Steganographia, a book at one time composed, in magic and enigmatic form, by Johannes Trithemius . . . 1624. 21., 572 numb. 1 incl. tables (part. fold.) 2 facsim. 33cm. [Typewritten copy of a translation from the Latin by Dr. J. W. H. Walden; bound in 3 v. With photostat copy of original Latin t.-p. and colophon. Copies are in the Fabyan Collection, Library of Congress, Washington, D. C., and in Harper Memorial Library, University of Chicago.]

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Davidis Solbrigii, soc. reg. scient. Boruss. Berolinens membri. Soltquellae vet. March. Typis Schusterianis a. MDCCXXVI. In-8°. [Wagner states in his "Studien," Vol. XIII, p. 42: "Davon erschien auch die pars II und eine deutsche Ausgabe noch in demselben Jahre." This work is likewise mentioned by Carmona (who however gives Frankfort as the place of publication), Klüber, Lacroix, and Lange et Soudart (who give the date as of 1756). See also Klüber, Kryptographik, p. 12.]

Allgemeine schrift, das ist: eine art durch ziffern zu schreiben, vermittelst deren alle nationen bey welchen nur einige weise zu schreiben im gerbrauch ist, ohne wissenschaft der sprachen, von allen dingen ihre meynungen einander mittheilen können. Der erste theil zum lesen, nebst nöthiger einleitung, exempeln und schlüssel, für die teutsche nation. Durch David Solbrig. . . Saltzwedel, druckts Christian Schuster, 1726. 7 leaves, 55 [1], 236p., 1 leaf, 16p., 540 numb. col. [4]p. front. fold. table. ["Des allgemeinen A, B, C, teutscher schlüssel zum lesen, zum gebrauch der Allgemeinen schrift": 236p., 1 leaf. "Schlüssel des zweyten theils der Allgemeinen schrift, zum concipiren oder schreiben. Für die teutsche nation" (with separate t.-p.): 16 p. "Schlüssel der teutschen sprache zum concipiren der Allgemeinen schrifft": 540 numb. cols. Some lists, as for example Carmona, Klüber and Lange et Soudart, give Coburg, 1736. In his "Studien," Vol. XIII, p. 42, Wagner states: Es handelt sich aber in allen diesen Werken ausschliesslich um Pasigraphie, nicht um Kryptographie."]

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- Trilling, L. R. [The Mendelsohn Collection of the University of Pennsylvania possesses a photostat copy of a code made from the notes of L. R. Trilling, an American soldier attached to the British forces from June 8th, 1918, until the Armistice. A typewritten leaf of explanatory notes accompanies the photostat. It is bound with: Dechiffriren der französischen Schriften.]
- Trithemius, Johannis. Steganographia: hoc est: Ars per occultam scripturam animi sui voluntatem absentibus aperiendi certa; authore reverendissimo et clarissimo viro, Joanne Trithemio . . . Præfixa est hvic operi sua Clavis, sev vera introductio ab ipso authore concinnata; hactenus quidem a multis multum desiderata, sed a paucissimis visa: nunc vero in gratiam secretioris philosophiæ studiosorum publici iuris facta . . . Francofurti: ex officina typographica Matthiae Beckeri, sumptibus Ioannis Berneri, 1606. 4 pl., 180, 70. 7 p. In-4°. [There is considerable disagreement concerning the early editions of this work. Meister states in his Die Geheimschrift im Dienste der päpstlichen Kurie . . ., p. 38, 1l. 8-12, that Tritheim had planned this work to consist of four books; that he finished the first,

March 27, 1500, the second, April 20 of the same year, "Dann war er bekanntlich in den Verdacht der Zauberei geraten, und so hatte er die Arbeit mit dem dritten Buche abgebrochen, das keinen Termin des Abschlusses mehr angibt . . .". The earliest date of publication is indicated by David Clément (Bibl. cur., p. 94), who mentions the existence of two very rare volumes, in-8°, which appeared in 1531, in Lyon. This date is likewise given by Carmona, Larousse: Grand Dictionnaire Universel, La Grande Encyclopédie, etc. The Encyclopaedia Britannica mentions an edition, Lyon, 1551, but later refers to the 1606 edition; Carmona refers to an edition, London, 1603. Furthermore, a certain amount of confusion exists in some of the lists because of their failure to differentiate between the editions of the Polygraphia and those of the Steganographia; in fact, it is stated in some that the Polygraphia was reprinted under the title of Steganographia. For example, La Grande Encyclopédie indicates the following editions for the two works: 1518, 1531, 1550, 1564, 1571, 1600, 1606, 1613, etc. However, the editions generally indicated for the Steganographia are those of the 17th century: Frankfort, 1606, 1608; Darmstadt, 1606, 1621; Cologne, 1631, 1635. In addition, Todd cites an edition, Nuremberg, 1721. (It should be noted that copies of several of the early editions of the Steganographia are accessible in American libraries: 1606 Frankfort edition, in New York Public Library and University of Michigan Library; 1606 Darmstadt edition, in University of Chicago Library; 1608 Frankfort edition, in New York Public Library and Yale University Library; 1621 Darmstadt edition, in Cornell University Library; 1721 Nuremberg edition, in Johns Hopkins Library. The Library of Congress possesses the following editions: 1606 Darmstadt; 1606 Frankfort; 1621 Darmstadt; 1635 Cologne; 1721 Nuremberg.)

Book I contains a list of 31 kinds of ciphers, Book II, 24, while Book III is devoted to other matters. Tritheim suggests various ways in which secrecy may be attained, as for example, by making the first and last words meaningless, or in other cases by using the first, third, fifth, etc., or the second, fourth, etc. The remaining words result in a composition which will contain the desired concealed message.

The strange and bizarre terms and characters which Tritheim interspersed throughout the composition of the work soon caused him to be suspected of dealing in the black art. It is recorded that Charles de Bouelles came to this conclusion while examining the manuscript of the work, and that shortly afterwards he succeeded in influencing Frederick II, known as the Wise, to deliver over to the flames a copy which his library contained. This suspicion continued all during the course of the 16th century, as is evidenced by the many allusions to it in the writings of that period. However, a number of more judiciously-minded readers of the work now came to the belief that Tritheim had done nothing more serious than to use the conventionalised language of the magicians

in, as Meister aptly terms it, a spirit of kindische Spielerei, and they therefore undertook to vindicate the author of the charges. Among the more noted of these apologists of Tritheim are: Sigmund Dullinger, abbot of the monastery of Seon, in his Trithemius sui ipsius vindex... Ingolstadii, 1616: Gustavus Selenus, in his Cryptomenytices... Lunæburgi, 1624; Jean Caramuel, in his Steganographiæ... Coloniæ Agrippinæ, 1635; Wolfgang Ernest Heidel, in his Steganographiae Trithemianae vindicatio et illustratio... Norimbergae, 1721; Daniel Georg Morhof, in his Polyhistor... Lubicae, 1688, etc.

For additional information concerning the life and works of Tritheim consult: Allgemeine Deutsche Biographie, Vol. 38, pp. 626-630; Nouvelle Biographie Générale, Vol. 45-46, pp. 644-647; Biographie Universelle, Vol. 42, pp. 178-183; Isidoro Silbernagel, Johannes Trithemius, eine Monographie; W. Schneegans, Abt Johannes Trithemius und Kloster Spanheim. See also Carmona, Tratado de criptografía, pp. 8, 58, 59, 60, 61 et passim, 173; Lange et Soudart, Traité de cryptographie, IV, 21, 24, 25, 71, 290-291; Locard, "Bibliographie cryptologique," p. 907; Meister, Die Geheimschrift im Dienste der päpstlichen Kurie..., pp. 38-39; Pratt, Secret and urgent, pp. 43, 61-62, 121; Wagner, "Studien," Vol. XI, pp. 160-170.

Polygraphiae libri sex, Ioannis Trithemii abbatis Peapolitani, quondam Spanheimensis, ad Maximilianum Caesarem. Impressum aere ac impensis integerrimi bibliopolae Joannis Haselbergi de Aia Constantiensis dioecesis, anno MDXVIII Mense Ivlio. 300 leaves, petit in-folio. (Other editions: Frankfort, 1550; Cologne, 1564, 1571, 1671, 1676, 1721; Argentorati, 1613; Strassbourg, 1600, 1613, 1621, 1637. Copies of several of the early editions of the Polygraphia are accessible in American libraries: 1550 Frankfort edition, in New York Public Library; 1564 Cologne edition, in Newberry Library, University of Chicago Library, and University of Michigan Library; 1600 Argentorati edition, in Yale University Library; 1613 Argentorati edition, in New York Public Library. The Library of Congress possesses the following editions: 1518 Oppenheim; 1550 Frankfort; 1564 Cologne; 1571 Cologne; 1600 Argentorati.) There is considerable disagreement concerning the date of the first edition: Bailey, in the Encyclopaedia Britannica, and Klüber, in his Kryptographik, p. 15, give 1500; Gioppi indicates Paris, 1508; Kerckhoffs gives 1508 "d'après la préface"; and Meister states in his Die Geheimscrift im Dienste der papstlichen Kurie . . ., p. 38, that Tritheim had ceased his cryptographic studies on the Steganographia after being accused of dealing in magic, but "Nach einigen Jahren war er wieder auf seine kryptographischen Studien zurückgekommen und hatte im Jahre 1508 seine Polygraphia zum Abschluss gebracht . . ." But in view of the suspicion and charges which the composition of his earlier volume, the Steganographia, had occasioned, it is readily understandable that the author must have exerted every care and effort to

prevent any semblance of cabalistic tinge from creeping into the pages of his new work.

Book I of the Polygraphia consists of 382 alphabets of 24 Latin words each, corresponding to each of the letters of the alphabet, and Book II contains 306 similar alphabets. As the words composing each alphabet have approximately the same meaning: (1st alphabet) Deus. creator, conditor, etc.; (2d alphabet) clemens, pius, etc., by taking the appropriate one from each alphabet, a person could form a phrase or a sentence which would not arouse any suspicion in transmission. To obtain the secret meaning from the message, all the correspondent had to do was to take down the letters corresponding to each word used. For example, the phrase conditor clemens discernens mundana would be deciphered as the word cave (conditor being c of the 1st alphabet: clemens, a of the 2d alphabet; discernens, v of the 3d alphabet; and mundana, e of the 4th alphabet).\* Book III contains 132 alphabets of words invented in such a way that a message written by means of them would give an uninitiated person the impression that it was in a foreign language. Book IV contains 118 alphabets of variously-invented words. Book V contains a number of alphabets, and deals with methods of enciphering by means of the transposition of letters. Book VI contains several alphabets of allegedly ancient writing characters which Tritheim offered as material for anyone who wished to create his own secret alphabet.

This celebrated work was translated into French by Gabriel de Collange under the title: Polygraphie et universelle escriture cabalistique de M. I. Tritheme abbé. Paris, 1561. In 1620, Dominique de Hottinga, a Frisian, perpetrated one of the world's most famous plagiarisms, by publishing Collange's work, likewise in French, but under his own name, and in addition with a preface in which he had the audacity to state how arduous the task of composing the work had been,—and he did not make any mention whatsoever of Collange or even of Tritheim.

It should be noted also that Tritheim was not only the first author to have written a comprehensive dissertation on cryptography, the Polygraphia, a work which became the basis upon which many later writers have worked, but in addition he possessed such a good knowledge of Tyronian notes that Dom Tassin and Dom Toustain, the authors of the Nouveau Traité de Diplomatique (T. 2, p. 126, and T. 3, p. 150) felt called upon to attribute to him the honor of having been the first to have published and to have interpreted some of these notes. For additional information concerning Tritheim and his works consult the list given under the Steganographia item, and in addition Klüber, Kryptographik, p. 15; Lange et Soudart, Traité de cryptographie, IV,

<sup>\* &</sup>quot;I haven't tried this myself but one of my associates, a Latin scholar, tried to compose a message of practical importance by this method and reported dismal failure!"

—William F. Friedman.

21, 24; Locard, "Bibliographie cryptologique," p. 905; Prou, Manuel

de paléographie latine et française, pp. 48, 81.]

Polygraphiæ libri sex, Ioannis Trithemii Abbatis Peapolitani, quondam Spanheimensis, ad Maximilianum Cæsarem. Accessit clauis Polygraphiæ liber unus eodem authore... Additæ sunt etiam aliquot Locorum Explicationes, eorum præsertim in quibus admirandi operis Steganographiæ principia latent, quæ ingeniosis occasionem præbent, longè maiora & subtiliora inueniendi. Per... Adolphvm á Glavbvrg... Francoforti: ex officina Cyriaci Iacobi, 1550. pp. 280. In-4°.

From the ancient wise men. Signs together with magic pictures
... Recovered from a manuscript of John Trithemius. Published ...
1612. [A typewritten manuscript in the Fabyan Collection, Library of

Congress, Washington, D. C.]

Tunberg, Sven. "Riksrådets Erik Brahes chifferkalendarium." Personhistorisk Tidskrift, 20th and 23d years, Stockholm, 1918-1922. [Contains examples of deciphering and details of historical interest. See also Locard, "Bibliographie cryptologique," p. 918.]

Turbayne, Albert A. Monograms and ciphers designed and drawn by A. A. Turbayne and other members of the Carlton studio. London and Edin-

burgh: T. C. & E. C. Jack, 1909. xxi, 136pl.

Türkel, Siegfried. Morse- und Morseähnliche Zeichen als Grundlage der Überschiffrierung. Eine kryptographische Studie, von Dozent Dr. Siegfried Türkel. Graz: Verlag von U. Mosers Buchhandlung (J. Meyerhoff), 1926. pp. 39. [Contains processes of cipherment. See also Lange et Soudart, Traité de cryptographie, XIV; Locard, "Bibliographie cryp-

tologique," p. 919.]

Chiffrieren mit Geräten und Maschinen. Eine Einführung in die Kryptographie, von Dozent Dr. Siegfried Türkel . . . Graz: Verlag von U. Mosers Buchhandlung (J. Meyerhoff), 1927. pp. 94. [Contains descriptions of cryptographic apparatus, and processes of cipherment. It was translated into English by the War Department as "Enciphering with Apparatus and Machines," 6-20-34. See also Locard, "Bibliographie cryptologique," p. 919.]

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Leipzig, Vol. 124, pp. 128-133.

Kryptographische Parerga (vom Chiffrieren und Dechiffrieren). Kasuistisches aus der kriminalistischen Praxis. Wissenschaftlicher Leiter des Kriminalistischen Instituts der Polizeidirektion Wien. Graz: Verlag von U. Mosers Buchhandlung (J. Meyerhoff), 1929. pp. 63. [Contains processes of cipherment. See also Lange et Soudart, Traité de cryptographie, XIV; Locard, "Bibliographie cryptologique," p. 920.]

Turner, Edward Raymond. "The Hindo Arabic numerals." Popular Science Monthly, New York, Dec. 1912, pp. 601-613.

Turrou, Leon G. Nazi spies in America. New York: Random House, 1938-1939. pp. 299. Second printing. [Contains portions of two cipher messages illustrated.]

## IJ

Uken, Melchias. Anweisung zum Dechiffriren, oder die Kunst, verborgene Schriften aufzulösen. Helmstädt: Bey Christian Friedrich Weygand, 1755. pp. 62. In-8°. [An interesting study dealing with methods of decipherment and the history of cryptography. Curiously, it has received various attributions of authorship in the different lists: anonymous, in the Klüber, Lange et Soudart, Locard and Wagner lists; a number of other lists attribute it to Johann Friedrich Hähn. See also Carmona, Tratado de criptografía, p. 177; Klüber, Kryptographik, p. 4; Lange et Soudart, Traité de cryptographie, XIV; Locard, "Bibliographie cryptologique," p. 910; Wagner, "Studien," Vol. XIII, p. 31.]

——— Steganometrographia; sive, Artificium novum et inauditum, quo

Jieganometrographia; sive, Artificium novum et inauditum, quo quilibet, etiam latinae linguae et poëseos ignavus soliusque maternae linguae beneficio instructus, epistolam latino aut germanico et quidem elegiaco carmine scribere potest . . ., cum Geomantia metrica. Utrumque artificium spatio horae dimidiae addisci potest. Authore Melchia Uken . . Francofurti et Lipsiae, apud Joan. Frider. Gaum, bibliopol., Ulm., 1751. xx, 308p. In-8° (Another edition, Ulm, 1759.) ["Steganometrographiae supplementum," pp. 89-214, and "Geomantia metrica," pp. 215-308, have separate title-pages with vignettes. This work was translated into German under the title: Steganographie, Geheimschreibkundst in Versen . . . Ulm, 1759. It deals especially with processes of cipherment. See also Carmona, Tratado de criptografía, pp. 176-177; Klüber, Kryptographik, p. 17; Lange et Soudart, Traité de cryptographie, XIV; Locard, "Bibliographie cryptologique," p. 910; Wagner, "Studien," Vol. XIII, p. 42.]

... Geheimschreibkundst in Versen, dadurch ein jeder, der auch die lateinische Sprache und Dichtkundst nicht versteht, allein durch Hülfe seiner Muttersprache einen lateinischen oder deutschen Brief, und zwar in einem elegiaschen Gedichte schreiben, und einem abwesenden die geheimen gedanken seines herzens... offenbaren kann... Nebst einer neuen Punctirkundst in Versen. In Ulm, Auf Kosten der Gaumischen Handlung, 1759. 31 leaves. In-8°.

"Uncle Sam, cipher wizard." Literary Digest, New York, Nov. 3, 1917, Vol. 55, pp. 46-51. [Elementary treatment of ciphers for the

general reading public.]

Unger, Johann Friedrich. Entwurf einer Maschine, wodurch Alles, was auf dem Clavier gespielt wird, sich von selber in Notem setzt. Braunschweig, 1774. In-4°. [Unger invented this machine as early as 1749, but a description of it appeared only in 1771 in Les Nouveaux Mémoires de l'Académie Royale de Prusse, Berlin, p. 538. He gives a detailed explanation of the origin of the idea in the above article. See also article "Unger" in Biographie Universelle, Vol. 42, pp. 356-357; Klüber, Kryptographik, p. 17.]

"Un initié. Mystères des sciences occultes." Paris, 1890, pp. 215-232. [Contains processes of cipherment. See also Locard, "Bibliogra-

phie cryptologique," p. 929.]

U. S. Army. A.E.F., 1917-1920. [Collection of "field codes".] 1918? 7 v. in 1. ["By command of General Pershing." A made-up collection of "field codes" in the form in which they were issued as separates of varying sizes and styles. Contents. -1. American radio service code, No. 1. -2. Field code, No. 1. -3. Field code, No. 3. -4. The "Hudson" code. -5. The "Allegheny" code. -6. The "Colorado" code. -7. The "Huron" code.]

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p. 2.]

U. S. Signal Corps. Office of the Chief Signal Officer. Signal Book, U. S. Army, 1912, 1914, 1916 . . . [Signalling of various kinds, and chapter on telegraph code books and ciphers, cipher disk, operator's cipher, route cipher, etc.]

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phie cryptologique," p. 930.]

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U. S. Signal Office. Division of telegrams and reports. Cipher. Signal Officer U.S.A. Division of telegrams and reports. Washington? 1873.

U. S. Signal Office. Division of telegrams and reports. Telegraph cipher. New edition. Signal Service, U.S.A. 1874. Division of telegrams and reports. Washington? 1874. (Another edition, 1875. Washington? pp. 42.).

U. S. Signal Office. Official danger. distress, and storm-signal codes for signal service sea-coast stations and mariners. Washington, D. C.: Gov't Print.

Off., 1883. pp. 91.

U. S. Signal Office. Manual of visual signalling of the U. S. Signal Corps. Prepared under the direction of Brigadier-General A. W. Greely, Chief Signal Officer, U. S. Army, by Captain D. J. Carr, Signal Corps. Washington, D. C.: Gov't. Print. Off., 1905. pp. 207.

U. S. Signal Office † . . . Elements of cryptanalysis . . . prepared in the Office of the Chief Signal Officer. May, 1923. Washington, D. C.: Gov't. Print. Off., 1924. pp. 157. (Training Pamphlet, No. 3). [Bibliographical list on pp. 142-143. War Department. Document No. 1117. Office of the Adjutant General. "The material contained in this pamphlet forms the basis of a course in military codes and ciphers given at the Signal School, Camp Alfred Vail, N. J., by Capt. W. F. Friedman" . . . -cf. p. v. See item under Friedman.]

- U. S. Signal Office † . . . Elementary military cryptography. 1935 edition. Prepared under the direction of the Chief Signal Officer for use with the Army extension courses. Washington, D. C.: Gov't. Print. Off., 1935. pp. 81. (Army Extension Courses. Special Text, No. 165.) W. F. Friedman, Principal cryptanalyst, Office of the Chief Signal Officer.
- U. S. Signal Office † . . . Advanced military cryptography. 1935 edition. Prepared under the direction of the Chief Signal Officer for use with the Army extension courses. Washington, D. C.: Gov't. Print. Off., 1935. pp. 113. (1936 edition, pp. 101.) (Army Extension Courses. Special Text, No. 166.) W. F. Friedman, Principal cryptanalyst, Office of the Chief Signal Officer.
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  ... Regulations governing drafting, classifying and filing cryptographic messages. Army Regulations, Nos. 335-6, 1-3, July 1937, pp. 13-33.
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No. 161; 10 avril, No. 217; 10 mai, No. 273.

"Un problème de cryptographie: la lettre de Desmaretz." L'Intermédiaire des Chercheurs et Curieux, Paris, 10 décembre, 1904, Nos. 835-836; 10 janvier, 1905, No. 22.

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<sup>†</sup> Restricted publication. Not available to the public.

## $\mathbf{V}$

Vaines, Dom François Joseph de. Dictionnaire raisonné de diplomatique, contenant les règles principales et essentielles pour servir à déchiffrer les anciens titres, diplômes et monuments, ainsi qu'à justifier de leur date et de leur authenticité. On y a joint des planches . . . avec des explications à chacune, pour aider également à connoitre les caractères et écritures des différents âges et de différentes nations. Paris: Lacombe, 1773-1774. 2 tom. In-8°. (2d ed., par A. Bonnetty, Paris, 1863-1865. 2 tom. In-8°.). [See Giry, Manuel de diplomatique, p. 67.]

Valade, Yves Léonard Remi. Études sur la lexicologie et la grammaire du langage natural des signes. Paris: Ladrange, 1854. xv, 219p.

Valdruche, Eugène. Cryptographie polygonale. Déposé le 10 janvier, 1899, aux bureaux de la Commission d'Examen des Inventions Intéressant les Armées de Terre et de Mer. aux Invalides. Eugène Valdruche, ancien directeur d'Establissements hospitaliers, 128, avenue d'Orléans, Paris. [Handwritten manuscript in 2 parts (31 pp. and 19 pp.) in the Fabyan Collection, Library of Congress, Washington, D. C.]

Valeriano Bolzani, Giovanni Piero. Joannis Pierii Valeriani Bellunensis Hieroglyphica, sive de sacris Aegyptiorum, aliarumque gentium litteris, commentariorum libri LVIII. duobus aliis ab eruditissimo viro [C. A. Curio] annexis. Acceserunt loco auctarii Hieroglyphicorum collectanea, ex veteris et recentioribus auctoribus descripta, et in sex libros ordine alphabetico digesta. Horapollinis item Hieroglyphicorum libri duo, ex postrema Davidis Haeschelii correctione. Praeterea ejusdem Pierii Declamatiuncula pro barbis sacerdotum: De infelicitate litteratorum libri duo; denique Antiquitatum Bellunensium sermones quatuor. Editio ad novissimas Germaniae composita, quibus et annotationes ad marginem atque necessarios indices debet. Francofurti ad Moenum, sumptibus Christiani Kirchneri, 1678. pp. 740. In-4°. (Other editions: Basel, 1556, 1567, 1575; Colonia Agripp., 1631; Florence, 1556; Frankfort, 1614, 1678; Lugdini, 1579, 1602, 1610; Venice, 1604.) [The first part of this study, the Hieroglyphica, appeared first at Basel, in 1556. According to the article in Biographie Universelle, Vol. 42, pp. 463-464: "L'auteur s'efforce d'expliquer par les symboles égyptiens, grecs et romains, presque toutes les branches de la science et de l'art; mais on a trouvé qu'il a déployé en cela plus d'érudition et d'imagination que de jugement." It was translated into French as: Les hieroglyphiques de lan-Pierre Valerian vulgairement nommé Pierius. Autrement commentaires des lettres et figures sacrées des AEgyptiens & autres nations . . . En cinquante huict liures, ausquels sont adjoincts deux autres de Cælivs Cvrio, touchant ce qui est signifié par les diuerses effigies, et pourtraicts des dieux, et des hommes. Novvellement donnez avx François, par I. de Montlyart . . . Lyon, 1615. An earlier French translation was made by Gabriel Chappuys, Lyons: Barth. Honorat, 1576, in-fol., and an Italian

one was published in Venice: Combi, 1625, in-fol. For additional information concerning Valeriano and his works consult *Biographie Universelle*, Vol. 42, pp. 463-464 and *Nouvelle Biographie Générale*, Vol. 45-46, pp. 869-870.]

- Valério, Paul Louis Eugène (Capitaine). De la cryptographie; essai sur les méthodes de déchiffrement. (1re partie, Paris, 1893; 2e partie, Paris, 1896). Paris: Libraire Militaire de L. Baudouin, 1893-1896. 2 vol. en 1. pp. 228. [Part 1 was published also during 1892-1894 in Journal des Sciences Militaires, Paris; Part 2, "Étude sur les procédés de déchiffrement des dictionnaires et des tables," likewise in the same journal in 1895, Vol. 57, p. 124 et seq.: Vol. 58, p. 127 et seq.. p. 285 et seq. Part 2 contains also "Déchiffrement de la correspondance de Henri IV et du Landgrave de Hesse," pp. 95-107. Valério bases his principles for deciphering upon the phonetic laws of languages. Hence, he devoted 150 pages or more to a study of frequencies of bigrams and trigrams of the main European languages, and a classification of the sounds occurring in those languages. His book stresses statistical data, methods of deciphering, processes of cipherment, and gives considerable information concerning codes. It is a very interesting work. See also Lange et Soudart, Traité de cryptographie, IX, 5, 32, 49, 64, 77, 107, 202, 216-217; Locard, "Bibliographie cryptologique," p. 915.7
- Van Dyke, M. D. (Pseud. King Tut). "The solution of French crypts." The Cryptogram, Rochester, N. Y., Aug. 1938, No. 40, p. 18.
- Vater, Johann Severin. Pasigraphie und antipasigraphie . . . ou sur la découverte récente d'une langue universelle pouvant servir à tous les peuples. Leipzig, 1799. pp. 268. In-12°. [For information concerning Vater and his works consult: Allgemeine Deutsche Biographie, Vol. 39, pp. 503-508; Biographie Universelle, Vol. 42, pp. 690-692; Nouvelle Biographie Générale, Vol. 45-46, pp. 991-992. See also Carmona, Tratado de criptografía, p. 178.]
- Pasigraphie und Antipasigraphie; oder über die neueste Ersindung einer allgemeinen Schriftsprache für alle Völker, und von Wolkens, Leibnitzens, Wilkins's und Kalmár's pasigraphischen Ideen. Ein Versuch
  ... Weissenfels und Leipzig, 1799. pp. 270. In-8°. [See Klüber, Kryptographik, p. 11.]
- Versuch einer allgemeinen Sprachlehre. Halle, 1801. [See Klüber, Kryptographik, p. 10.]
- Lehrbuch der allgemeinen Sprache. Halle, 1805. [See Klüber, Kryptographik, p. 10.]
- Vergennes, Charles Gravier (Comte de). Geheime Polizey-schrift des Grafen von Vergennes, als ein Beweis der feinen Politik des ehemaligen Kabinets in Versailles unter der Regierung des unglücklichen Königs Ludwigs des Sechszehnten. Eisenach. Bei Johann Georg Ernst Wittekindt. 1793. pp. 46. In-8°. ["Was ich hier geliefert habe, ist indessen nur ein getreuer auszug aus der Geheimen Polizey-schrift des Grafen von

Vergennes. Das französische original derselben bestand aus 13 geschriebenen bogen." —cf. p. 45. This work stresses processes of cipherment. For information concerning Count Vergennes and his work consult Biographie Universelle. Vol. 43, pp. 150-154 and Nouvelle Biographie Générale, Vol. 45-46, pp. 1106-1110. Consult also § 5, "Carte misteriose del signor di Vergennes," pp. 27-32 of La crittografia o l'arte di scrivere in cifre, Presso Emilio Croce, Milano. See also Carmona, Tratado de criptografía, p. 177; Dröscher, Die Methoden der Geheimschriften . . , X, 82; Klüber, Kryptographik. p. 11; Lange et Soudart, Traité de cryptographie, XI; Locard, "Bibliographie cryptologique," p. 911; Wagner, "Studien," Vol. XIII, p. 42.]

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La Cryptographie dévoilée, ou Art de traduire ou de déchiffrer toutes les écritures en quelques caractères et en quelques langues que ce soit, quoique l'on ne connaisse ni ces caractères ni ces langues; appliqué aux langues française, allemande, anglaise, latine, italienne, flamande et hollandaise; suivi d'un précis analytique des langues écrites, au moyen duquel on peut les traduire, sans en avoir aucune connaissance préalable. Bruxelles: Deprez-Parent, 1840. 1 vol. pp. 331. In-8°. (A new edition appeared in Paris, 1857.) [The work contains considerable informa-

tion concerning methods of deciphering, processes of cipherment, and statistical data. Carmona reproduces in Appendix, Número 13, p. 203 of his *Tratado de criptografía*, the tables of letter frequencies taken from page 274 of Vesin de Romanini's work. See also Carmona, *Tratado de criptografía*, p. 178; Lange et Soudart, *Traité de cryptographie*, VII, 22, 41, 107; Locard, "Bibliographie cryptologique," p. 912.]

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  - L'art de chiffrer et déchiffrer les dépêches secrètes. Paris: Gauthier-Villars et Fils, 1893. pp. 175. In-12°. (Encyclopédie Scientifique des Aide-mémoire. Section de l'Ingénieur.) [Contains processes of cipherment, methods and examples of deciphering, information concerning theories of ciphers, statistical data, and a bibliographical list of four items, p. 165. See also Lange et Soudart, Traité de cryptographie, IX, 78, 107, 122, 219; Locard, "Bibliographie cryptologique," p. 915.]
    - Les dépêches secrètes et conventions internationales. Paris, 1893. [See Lange et Soudart, Traité de cryptographie, XIV.]

— A B C Répertoire cryptographique chiffrant et déchiffrant. Paris: Imprimerie Nationale, 1898. pp. 20. [See Lange et Soudart, Traité de cryptographie, XV.]

Viète, François. Deschifrement d'une lettre escrite par le Commandeur Morco au roy d'Espaigne, son maistre, du 28 octobre 1589. Tours: Jamet-Mettayer, 1590. pp. 14. In-8°. [The principal decipherings of this famous French mathematician are preserved in manuscript form in the Bibliothèque Nationale, Paris (Département des Manuscrits: Les 500 de Colbert.). By some authorities Viète is reported to have written a Traité des règles trouvées pour le déchiffrement des écritures secrètes. but the existence of this work is quite problematical. Additional information concerning Viète and his work may be gained by consulting Biographie Universelle, Vol. 43, pp. 361-363; Nouvelle Biographie Générale, Vol. 45-46, pp. 135-137; Larousse: Grand Dictionnaire Universel, Vol. 15, p. 1030; Tallemant des Réaux, Les historiettes . . ., Paris: Techener, 1865, Ch. 53: "Viète." See also Carmona, Tratado de criptografía, p. 13; Baschet, Les Archives de Venise, p. 578; Dröscher, Die Methoden der Geheimschriften. . ., 24; Klüber, Kryptographik, p. 17; Lange et Soudart, Traité de cryptographie. XI, 31, 34; Locard, "Bibliographie cryptologique," p. 906; Wagner, "Studien," Vol. XII, pp. 28-29.]

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Mendelsohn Collection of the University of Pennsylvania has negative photostats of pp. 659-695, 16 leaves, "Epistolarum collectio", from Johannis Wallis . . . Operum mathematicorum. volumen tertium. Oxoniae. An. Dom. MDCXCIX. For additional biographical and bibliographical information concerning Wallis and his works consult: Biographie Universelle, Vol. 44, pp. 283-284; Dictionary of National Biography. Vol. LIX, pp. 141-145; Nouvelle Biographie Générale, Vol. 45-46, pp. 530-532. See also Carmona, Tratado de criptografía, p. 176; Locard, "Bibliographie cryptologique," p. 923; Monthly Magazine. London, June, July 1802, Vol. XIII, pp. 446, 560; Oct. 1802, Jan. 1803, Vol. XIV, pp. 252, 521; Wimsatt, "What Poe knew about cryptography," Publications of the Modern Language Association of America, New York, Sept. 1943, Vol. LVIII, No. 3, p. 774, Note.]

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<sup>\* &</sup>quot;Credit for the invention of the principle now known as the Wheatstone (where a sequence of n characters is slid against another sequence of n+m characters) really belongs to an American, Decius Wadsworth, an associate of Eli Whitney. In 1819 Wadsworth constructed a beautiful model of a cryptograph based on this principle. The model belongs to the Hampden Historical Society of Hampden, Conn., and is now on temporary loan to the War Department."—Note by William F. Friedman.

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# X

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Author's Note.—The author regrets to state that he was unable to verify completely the bibliographical details in the items under: Ammon, Chanidzé, Kryha, Norway, Phillip, Robinson, Schmidt, and Wilmers.

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